



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/571,140	03/09/2006	Fumihito Yaguchi	0038-0491PUS1	3933
2292 7590 12/10/2009 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER BOBISH, CHRISTOPHER S				
ART UNIT 3746		PAPER NUMBER		
NOTIFICATION DATE 12/10/2009		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/571,140

Applicant(s)

YAGUCHI ET AL.

Examiner

CHRISTOPHER BOBISH

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7 and 9-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7 and 9-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/GS/US)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

The response filed on 09/10/2009 under 37 CFR 1.131 has been considered but is ineffective to overcome the Hirabayashi and Kurahashi references.

Claims 7 and 9-10 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirabayashi (European Patent Application No. 0605903 A1) in view of Kurahashi et al (JP 03- 31913 B2).

Claim 7;

Hirabayashi teaches:

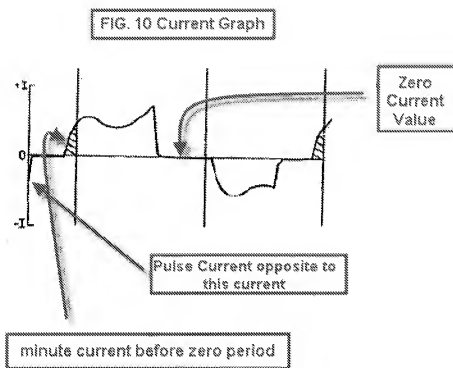
a method of driving an electromagnetic pump, the method comprising: conveying a fluid from a pump chamber, **FIG. 1 (2) C. 4 Line 32-33**, formed inside a

cylinder, **FIG. 1 (4) C. 4 Lines 31-33**, by housing a plunger, **FIG. 1 (10) C. 4 Lines 37**, including a permanent magnet, **FIG. 1 (27) C. 4 Line 38**, inside the cylinder; passing a current through an aircore electromagnetic coil, **FIG. 1 (11a, 11b) C. 4 Lines 30-31**, fitted around the cylinder to reciprocally move the plunger in the axial direction inside the cylinder, **C. 1 Lines 34-36**;

Hirabayashi does not teach a driving current including a period of zero voltage nor does Hirabayashi teach a minute voltage pulse, but Kurahashi does.

Kurahashi teaches:

a method of driving an electromagnetic pump comprising: **examiner considers a compressor to be equivalent to a pump, it would be obvious to use the method taught by Kurahashi with the magnetic pump of Hirabayashi**, flowing a pulse current including a period where a voltage or current value is zero when a supplied current of the electromagnetic coil is inverted (**see Page 2 Lines 2-11 of the translation**); wherein a pulse minute current of at least 30 percent of an inverted maximum current, whose current direction is opposite to that of the current passing through the electromagnetic coil immediately before flowing the pulse current, flows for a minute time period before the period where the current value is zero, when the polarity of the applied current of the electromagnetic coil is inverted (**see the adapted version of the third graph in FIG. 10 as provided below**);



It would have been obvious to one having ordinary skill in the art at the time of the invention to combine the driving method of Kurahashi with the magnetic pump of Hirabayashi to reduce vibrations cause by the reciprocating piston when the voltage polarity is switched.

Claims 9 and 10;

Hirabayashi further teaches:

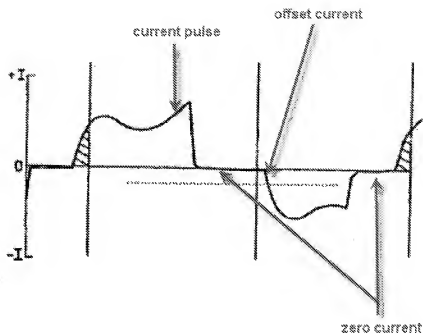
a method of driving an electromagnetic pump, the method comprising: conveying a fluid from a pump chamber, FIG. 1 (2) C. 4 Line 32-33, formed inside a cylinder, FIG. 1 (4) C. 4 Lines 31-33, by housing a plunger, FIG. 1 (10) C. 4

Lines 37, including a permanent magnet, **FIG. 1 (27) C. 4 Line 38**, inside the cylinder; passing a current through an aircore electromagnetic coil, **FIG. 1 (11a, 11b) C. 4 Lines 30-31**, fitted around the cylinder to reciprocally move the plunger in the axial direction inside the cylinder, **C. 1 Lines 34-36**;

Hirabayashi does not teach an offset voltage, but Kurahashi does.

Kurahashi teaches:

a method of driving an electromagnetic pump, **examiner considers a compressor to be equivalent to a pump, it would be obvious to use the method taught by Kurahashi with the magnetic pump of Hirabayashi**, the method comprising: firstly flowing an offset current of no greater than 30% of an inverted maximum current, whose current direction is opposite to that of the current passing through the electromagnetic coil immediately before flowing the offset current, when a polarity of a supplied current of the electromagnetic coil is inverted, wherein a period where a minute current pulse at least 30 percent of the maximum current flows is set before a period when the offset current flows; **FIG. 10 included below and amended by the examiner shows an offset voltage being applied when the polarity of the driving voltage changes, the current as labeled does not appear to be greater than 30% of the max voltage**;



It would have been obvious to one having ordinary skill in the art at the time of the invention to combine the driving method of Kurahashi with the magnetic pump of Hirabayashi to reduce vibrations cause by the reciprocating piston when the voltage polarity is switched.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirabayashi (European Patent Application No. 0605903 A1) in view of Waring (US Patent No. 4,940,035).

Hirabayashi teaches:

a method of driving an electromagnetic pump, the method comprising: conveying a fluid from a pump chamber, **FIG. 1 (2) C. 4 Line 32-33**, formed inside a cylinder, **FIG. 1 (4) C. 4 Lines 31-33**, by housing a plunger, **FIG. 1 (10) C. 4 Lines 37**, including a permanent magnet, **FIG. 1 (27) C. 4 Line 38**, inside the cylinder; passing a current through an aircore electromagnetic coil, **FIG. 1 (11a, 11b) C. 4 Lines 30-31**, fitted around the cylinder to reciprocally move the plunger in the axial direction inside the cylinder, **C. 1 Lines 34-36**;

Hirabayashi does not teach a driving current including a period of zero voltage nor does Hirabayashi teach a minute voltage pulse, but Waring does.

Waring teaches:

a method of driving an electromagnetic pump, the method comprising: flowing a pulse current including a period where a voltage or current value is zero when a supplied current of the electromagnetic coil is inverted (**see C. 8 Line 43 through C. 9 Line 7; FIG. 7**); wherein a pulse minute current (**T2**) of at least 30 percent of an inverted maximum current, whose current direction is opposite to that of the current passing through the electromagnetic coil immediately before flowing the pulse current (**opposite to first portion of T1**), flows for a minute time period before the period where the current value is zero, when the polarity of the applied current of the electromagnetic coil is inverted (**inverted across O-axis**);

It would have been obvious to one of ordinary skill in the art of electromagnetic pumps at the time of the invention to use the method of controlling a pump as taught by Waring to drive the pump of Hirabayashi in order to dampen to piston at its end points.

Response to Arguments

Applicant's arguments filed 09/10/2009 have been fully considered but they are not persuasive.

In regards to the applicant's argument that the Hirabayashi and Kurahashi references should not be combined due to mechanical differences, the examiner respectfully disagrees. The Kurahashi reference is relied upon solely to teach a waveform shape of a driving current to control a reciprocating piston device. The method of controlling piston motion as taught by Kurahashi can be utilized in the pump of Hirabayashi without necessitating the use of its mechanical features. Due to the benefits of the Kurahashi method, the examiner maintains the rejection of claims 7 and 9-10 in view of Hirabayashi and Kurahashi.

Applicant argues that the pulse current taught by Hirabayashi is not "willfully input", and therefore does not read on the applicants claims. However examiner disagrees for the following reasons. The current pulse taught by Hirabayashi in FIG. 10, whether applied willingly or as an inherent feature is still producing the same effect on the motor, and will read on the limitations of claims 7, 9 and 10. The same argument applies to the offset current.

The examiner notes that the first page of applicant's arguments concerning the rejections contains language that is narrower or at least different from the claim language. For example:

"These features are supported at least by Figure 10 and paragraphs [0059] and [0060] of the publication of the present application. Note that the offset current in amended claim 9, which is no greater than 30% of the inverted maximum current, **flows during the periods where the current value is zero** as shown in Figure 10. In addition, the **minute pulse current in amended claim 7 flows before the period where the offset current flows** is shown in Figure 10 (see the dotted-lines). "

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER BOBISH whose telephone number is (571)270-5289. The examiner can normally be reached on Monday through Thursday, 7:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571)272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher Bobish/
Examiner, Art Unit 3746

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3746

/C. B./
Examiner, Art Unit 3746

